

Title (en)

GROUP-III NITRIDE BASED HIGH ELECTRON MOBILITY TRANSISTOR (HEMT) WITH BARRIER/SPACER LAYER

Title (de)

TRANSISTOR MIT HOHER ELEKTRONENMOBILITÄT (HEMT) AUF DER BASIS VON GRUPPE-III-NITRID MIT BARRIEREN-/ABSTANDSSCHICHT

Title (fr)

TRANSISTOR A HAUTE MOBILITE D'ELECTRONS (HEMT) A BASE DE NITRURES D'ELEMENTS DU GROUPE III AVEC COUCHE DE BLOCAGE/DE SEPARATION

Publication

EP 1390983 B1 20130814 (EN)

Application

EP 02769655 A 20020411

Priority

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- US 29019501 P 20010511
- US 10227202 A 20020319

Abstract (en)

[origin: US2002167023A1] A Group III nitride based high electron mobility transistors (HEMT) is disclosed that provides improved high frequency performance. One embodiment of the HEMT comprises a GaN buffer layer, with an $\text{Al}_y\text{Ga}_{1-y}\text{N}$ ($y=1$ or $y \approx 1$) layer on the GaN buffer layer. An $\text{Al}_x\text{Ga}_{1-x}\text{N}$ ($0 \leq x \leq 0.5$) barrier layer on to the $\text{Al}_y\text{Ga}_{1-y}\text{N}$ layer, opposite the GaN buffer layer, $\text{Al}_y\text{Ga}_{1-y}\text{N}$ layer having a higher Al concentration than that of the $\text{Al}_x\text{Ga}_{1-x}\text{N}$ barrier layer. A preferred $\text{Al}_y\text{Ga}_{1-y}\text{N}$ layer has $y=1$ or $y \approx 1$ and a preferred $\text{Al}_x\text{Ga}_{1-x}\text{N}$ barrier layer has $0 \leq x \leq 0.5$. A 2DEG forms at the interface between the GaN buffer layer and the $\text{Al}_y\text{Ga}_{1-y}\text{N}$ layer. Respective source, drain and gate contacts are formed on the $\text{Al}_x\text{Ga}_{1-x}\text{N}$ barrier layer. The HEMT can also comprising a substrate adjacent to the buffer layer, opposite the $\text{Al}_y\text{Ga}_{1-y}\text{N}$ layer and a nucleation layer between the $\text{Al}_x\text{Ga}_{1-x}\text{N}$ buffer layer and the substrate.

IPC 8 full level

H01L 29/778 (2006.01); **H01L 29/812** (2006.01); **H01L 21/338** (2006.01); **H01L 29/20** (2006.01)

CPC (source: EP KR US)

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US 2002167023 A1 20021114; **US 6849882 B2 20050201**; CA 2447058 A1 20021121; CA 2447058 C 20161025; CN 100373632 C 20080305; CN 1596477 A 20050316; EP 1390983 A1 20040225; EP 1390983 B1 20130814; EP 1390983 B2 20170412; EP 2282346 A2 20110209; EP 2282346 A3 20110427; EP 2282346 B1 20191030; EP 2282347 A2 20110209; EP 2282347 A3 20110427; EP 2282347 B1 20200603; JP 2005509274 A 20050407; JP 2012156538 A 20120816; JP 5004403 B2 20120822; KR 100869521 B1 20081119; KR 20030092143 A 20031203; MY 128473 A 20070228; TW 579600 B 20040311; WO 02093650 A1 20021121

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